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RIN 2115- AG21; USCG-2001-10486; 25

**Comments by the Northeast-Midwest Institute
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June 3, 2002**

Q1: G1 offers the best projection based on existing science of what may be needed for a final ballast water management standard. Future science, however, may help resolve 1) the actual inoculation thresholds of concern for various taxa, 2) the extent to which transfers of bacteria are a concern and can be prevented by the limits proposed, and 3) the relative contribution that such limits imposed on ballast water provide given levels of inoculation caused by hull fouling and other modes of transfer associated with ships. All of this is to say that G1 offers a good "preliminary estimate" of a final BWM standard. Because the final standard will not come into effect for some time, there may be an opportunity to refine this estimate in the future prior to its entry into regulatory force.

Q2: S1 and S3 offer appropriate interim standards. However, the type approval process should not be that outlined in S1. Instead of using a contrived "biological soup" in a land-based type-approval scenario to evaluate performance, performance of the treatment systems should be evaluated in the shipboard context against ambient intake concentrations for at least the taxonomic groups listed (add vertebrates) from a variety of source systems over a 6-12 month "probationary period" for the technology. A land-based scenario with an experimental soup may be appropriate for informing agencies as to whether a proposed treatment may merit shipboard type-approval. Side-by-side evaluation of alternatives with BWE is of basic research interest but should not be incorporated into a type-approval process for BWT because it will be extremely expensive and imprecise.

Expression of the reduction efficiencies contained in S1 and S3 in terms of absolute concentrations would be handy, but it is probably not possible to do effectively.

While S2 and S4 offer some advantages in terms of measurement in shipboard application, they are not usable interim or final standards as currently stated. The standards are unclear about the dimension discussed (length or width), creating a great deal of ambiguity relative to the actual performance sought. Moreover, the neutrality of these standards to efficiency of reduction of particular taxonomic groups could limit the scope of usable technologies with little biological gain. For example, a technology that does not completely kill or remove colonial algal particles greater than 50 (or 100) microns would be disqualified, even if the preponderance of particles of that particular taxonomic group is below 50 (or 100) microns.

If the S4 were refined to state no viable animal taxa above 50 in length, and

associated with some reduction efficiency relative to phytoplankton and bacteria, it would be much more powerful. S2 is overly lenient and may not provide levels of reduction equivalent even to BWE of key taxa.

Q3 and Q4: It is a severe failing of our existing program (or lack thereof) that after 12 years of statutory sanction for ships to utilize technologies to meet regulatory requirements (in the GL) we still do not have much information on treatment performance in the shipboard context. At this time, we do not know if treatments can achieve the standards that we are discussing. We need more experiments on ships to begin to establish 1) achievable levels of performance, 2) cost trade-offs for a range of performance levels, and 3) best ways to measure treatment performance and cost levels. Standards for treatment which are likely to lead to better performance than BWE but are not a pipe-dream will help to bring this understanding and information to bear for implementation of the final standard. Accurate cost-effectiveness estimates will also depend upon economic studies of the impacts of invaders on receiving systems and economies.

Environmental Soundness – Robust environmental soundness screens with clear criteria for vendors and ship owners to respond to will be essential to the development of lasting and widely applicable treatment tools. NISA calls for environmentally sound treatment, but no process for assessing it has yet been established.

Phase-In: A transition to treatment from BWE will require a phase-in period, and a date certain after which all ships must meet a single biological performance standard (or technology-based standard such as BAT). This final standard will require new authority for the USCG. During the interim period (currently authorized by NISA), both BWE (meeting regulatory operational requirements) or treatments (meeting the regulatory interim standard based on type approval), should be allowable. After a time certain (e.g. 10 years), the final standard should take effect covering all ships. New ships should be required to install treatment if they enter service after 2005, but this will also require new authority for the USCG.